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Recent advancement in transcranial brain imaging using photoacoustic computed tomography

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Abstract

Photoacoustic computed tomography (PACT) holds great promise for transcranial brain imaging. However, the strong reflection, scattering, and attenuation of acoustic waves by the skull present significant challenges for image reconstruction. In this talk, we will review our recent progress on transcranial PACT image reconstruction. Our contributions include the following: (1) development of a methodology to establish a discrete transcranial PACT image model by use of adjunct X-ray CT data; (2) development of image reconstruction methods that can compensate for speed-of-sound and density variations within the skull; and (3) a detailed investigation of the role of shear waves in transcranial PACT. Computer-simulated and experimental data are employed to demonstrate the feasibility of transcranial PACT.

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Key Topics

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scattering